LOUISIANA TECHNOLOGY INNOVATIONS FUND
POST-COMPLETION PROJECT UPDATE REPORT
12 March 2004

I. DEPARTMENT / AGENCY

Louisiana State University, Department of Physics and Astronomy

II. PROJECT TITLE

"Training Today's Students for Tomorrow's Internet Work Environment"

III. PROJECT LEADER

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IV. DESCRIPTION OF THE PROJECT

During this project we will develop a system to provide today's school children with experience in using the internet to control, access and operate robotic instruments much in the way that they may in tomorrow's high technology network based work environment. This will include internet control interfaces for the Highland Road Park Observatory telescope, for the ATIC balloon-borne "space" experiment and for a HAM radio satellite communication system. In addition a group of teacher leaders will work with us to develop a curriculum that will provide the context and structure necessary for students to use these internet accessed instruments effectively. During the project we will partner with various community and business organizations such as HAM radio operators, amateur astronomers, Southern University, LaSPACE, and a local television station to provide needed expertise and to enhance the quality of the product. The final products of this project will include a set of operational internet "robots", the materials necessary to train teachers in the use of these devices, the supporting classroom materials to be used by students, and an evaluation of the project effectiveness based upon classroom assessments

V. POST COMPLETION UPDATE

Work has continued with this project, but at a slower pace consistent with available resources. We have recently installed a small radio telescope at the observatory (see Figure 1) as an enhancement to the original proposed effort. The radio telescope can be used to look at astronomical objects with “invisible

Fig 1: Internet accessible radio telescope at the HRPO

light" (i.e. radio waves). Particular sources that can be studied include the Sun, interstellar gas clouds, radio active stars, our galaxy as a whole and possibly Jupiter and Venus. A great advantage of the radio telescope is that unlike the optical telescope where imaging can only be done on clear, dark nights, radio observations can be done anytime day or night and clear weather is not necessary. Thus, it will be easier for classrooms to use the radio telescope their normal daytime sessions. A preliminary internet interface has been developed for the radio telescope and the system is waiting for final testing and calibration before going operational.

We are also in the process of installing remote telescopes at the LSMSA in Natchitoches, LA and at LIGO in Livingston, LA. All required equipment is in hand and we are waiting for final signoffs on the land use in Natchitoches and for LIGO to build the telescope housing. We expect the Natchitoches signoff to be completed within the next few months, allowing the installation of the dome and telescope equipment to be completed by early summer and to begin internet operation of this site by fall, 2004. Negotiations with LIGO on the telescope housing are still underway and we are pressing to have a schedule commitment within the next several weeks.

There has also been some progress on the internet control software for the optical telescope. During fall, 2002 the telescope drive and control system underwent a major upgrade. This upgrade has significantly improved the pointing and tracking accuracy of the telescope and, thus, decreases our need to rely on automated position sensing software for our internet operations. We have also been successful in developing several new software drivers that are essential for automated observatory operation. Finally, we are waiting on the return of our Apogee AP47 telescope cameras that the vendor has agreed to upgrade to a version that can be directly controlled over the internet. With this upgrade our telescope internet control software will be simplified and image downloading speed will significantly increased. With these improvements we are anticipating to be able to operate the optical telescope reliably from remote locations on the internet by fall, 2004. In addition, we have made progress in transmitting near-real time "video" images from the optical telescope over the internet. In particular, using the hardware and software established under this LTIF project, we were able to bring images of a lunar eclipse into the recently opened Irene W. Pennington Planetarium in downtown Baton Rouge. The images were updated every 15 seconds and downloaded to the planetarium over the internet providing a "live" experience of the eclipse.

The "internet robots" developed under this program continue to be of interest and useful to teachers and students. The number of field trips by school classrooms to the observatory, where a majority of the systems are located, has increased by about 25% over the last year. During these field trip teachers and students are introduced to the optical telescope and HAM radio systems and demonstrations are provided. Further, several of the teachers in the pilot ROBIE workshop continue to use some of the associated lesson plans in their classrooms. Unfortunately we have not been successful, so far, in obtaining the funding necessary to support expanded teacher training workshops. Over the last few years we have submitted two proposals to NSF and one to LaSIP that would have included such training as part of the effort, but none of these were funded. Over the next several years we will continue the effort to expand this program.

VI. PUBLICATIONS, PRESENTATIONS

1. "Space Science Public Outreach at Louisiana State University", T.G. Guzik, E. Babin, W. Cooney, J. Giammanco, D. Hartman, R. McNeil, M. Slovak and J.G. Stacy, Advances in Space Research (in press), 2004
2. "Antarctica – Science on Ice" – 50 minute long documentary on the ATIC-1 balloon flight in Antarctica during the 2000-2001 season that was produced by Bill Rodman and aired on WAFB during 2001 and LPB during 2002.
3. "Space Science Public Outreach at Louisiana State University", T.G. Guzik, J. Giammanco, R. McNeil, M. Slovak, J.G. Stacy, E. Babin, D. Hartman, W. Cooney, presentation at the 34th Committee on Space Research Scientific Assembly and The Second World Space Congress, Houston, TX, USA, (2002).
4. "A Community Partnership to Support Public Space Science Education in Louisiana", T.G. Guzik, E. Babin, D. Hartman, and W. Cooney, presentation to the NASA Office of Space Science Education and Public Outreach Conference (2002).
5. Invited talk "Empowering Teachers to Address Space Science Content Standards in the Classroom", NASA Office of Space Science Education and Public Outreach Conference (2002)
6. Invited member of the Formal Science Education panel at the NASA Office of Space Science Education and Public Outreach Conference (2002)